### WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care

**Worksheet author(s)**

| Barbara Caracci | Date Submitted for review: 01/06/10 |

### Clinical question.

When direct pressure fails to stop bleeding, does the application of hemostatic agents improve outcome?

### Is this question addressing an intervention/therapy, prognosis or diagnosis? Yes

### State if this is a proposed new topic or revision of existing worksheet: New topic

### Conflict of interest specific to this question

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? No

### Search strategy (including electronic databases searched).

The following databases were searched: EMBASE and PUB MED using *hemostasis* or *hemostatic agents* or *hemorrhage* or *bleeding control* or *Quick Clot* or *CELOX* or *Hem Con*, review of references from articles/studies found in EMBASE and PUB MED; hand search of *The Journal of Trauma® Injury, Infection, and Critical Care*.

### State inclusion and exclusion criteria

**Inclusion criteria:** all studies exploring effects of hemostatic agents in life-threatening hemorrhage.

**Exclusion criteria:** articles, non peer-reviewed studies, studies where there was no comparison to other means of controlling bleeding, studies on effects of hemostatic agents on nerve function, studies on use of hemostatic agents to prevent fatal infections developing from contaminated wounds, studies exploring effects of hemostatic agents to stop expected bleeding during surgery, data base review of animal and human cases.

### Number of articles/sources meeting criteria for further review:

5 human and 10 animal studies
# Summary of evidence

## Evidence Supporting Clinical Question

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<th>Fair</th>
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### Good
- Sohn 2009—E1
- McManus 2008—E1
- Carraway 2008—E1
- Kozen 2007—E1
- Ward 2007—E1
- Pusateri 2004—E1
- Alam 2004—E1
- Alam 2003—E1
- Pusateri 2003—E1

### Fair
- Rhee 2008—E1
- Brown 2009—E1
- Wedmore 2006—E1
- Wright 2004—E1
- King 2004—E1

### Poor
- Jewelewicz 2003—E1

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*E = Other    E1= hemostasis

*italics* = Animal studies*
Evidence Neutral to Clinical question

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*Italics = Animal studies*

Evidence Opposing Clinical Question

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*Italics = Animal studies*
Five LOE4 studies in humans (Brown 2009, 1; King 2004, 756; Rhee 2008, 1093; Wedmore 2006, 655; Wright 2004, 205) show significant improvement in control of bleeding following the use of topical hemostatic agents for victims of life-threatening bleeding that was not controlled by standard techniques. This benefit outcome is supported by 10 LOE5 animal studies (Alam 2003, 1077; Alam 2004, 974; Carraway 2008, 230; Jewelewicz 2003, 275; Kozen 2007, 560; McManus 2008, 477; Pusateri 2003, 177; Pusateri 2004, 555; Sohn 2009, 258; Ward 2007, 276). Performance among various topical hemostatic agents varies. Adverse effects of pain, discomfort, exothermic burns and potential foreign-body reaction were cited (Pusateri 2004; Alam 2004; Rhee 2008).

Acknowledgements:

Citation List


2. Alam, Hasan; Uy, Gemma; Miller, Dana; Koustita, Elena; Hancock, Timothy; Inocencio, Ryan; Anderson, Daniel; Llorente, Orlando; Rhee, Peter. Comparative Analysis of Hemostatic Agents in a Swine Model of Lethal Groin Injury. The Journal of TRAUMA® injury, Infection, and Critical Care, Volume 54, Number 6, June 2003, pp. 1077 – 1082


10. Pusateri, Anthony; McCarthy, Simon; Gregory, Kenton; Harris, Richard; Cardenas, Luis; McManus, Albert; Goodwin, Jr., Cleon. Effect of a Chitosan-Based Hemostatic Dressing on Blood Loss and Survival in a Model of Severe Venous

11. Rhee, Peter; Brown, Carlos; Martin, Matthew; Salim, Ali; Plurad, Dave; Green, Donald; Chambers, Lowell; Demetriades, Demetrios; Velmahos, George; Alam, Hassan. QuickClot Use in Trauma for Hemorrhage Control: Case Series of 103 Documented Uses. The Journal of TRAUMA®, injury, Infection, and Critical Care, Volume 64, Number 4, April 2008, pp. 1093 – 1099

12. Sohn, Vance; Eckert, Matthew; Martin, Matthew; Arthurs, Zachary; Perry, Jason; Beekley, Alec; Rubel, Eric; Adams, Richard; Bickett, Gerald; Rush, Robert. Efficacy of Three Topical Hemostatic Agents Applied by Medics in a Lethal Groin Injury Model. Journal of Surgical Research, Volume 154, Number 2, June 2009, pp. 258 – 261

13. Ward, Kevin; Tiba, M. Hakam; Holbert, William; Blocher, Charles; Draucker, Gerard; Proffitt, E. Kate; Bowlin, Gary; Ivatury, Rao; Diegelmann, Robert. Comparison of a New Hemostatic Agent to Current Combat Hemostatic Agents in a Swine Model of Lethal Extremity Arterial Hemorrhage. The Journal of TRAUMA®, injury, Infection, and Critical Care, Volume 63, Number 2, August 2007, pp. 276 – 284


15. Wright, Franklin; Hua, Hong; Velmahos, George; Thoman, Dave; Demetriades, Demetrios; Rhee, Peter. Intracorporeal Use of the Hemostatic Agent QuickClot in a Coagulopathic Patient with Combined Thoracoabdominal Penetrating Trauma. The Journal of TRAUMA®, injury, Infection, and Critical Care, Volume 56, Number 1, January 2004, pp. 205 – 208